Definitions

In physics we have two types of measurable quantities: **vectors** and **scalars**.

Scalars: have *magnitude* (magnitude means size) only

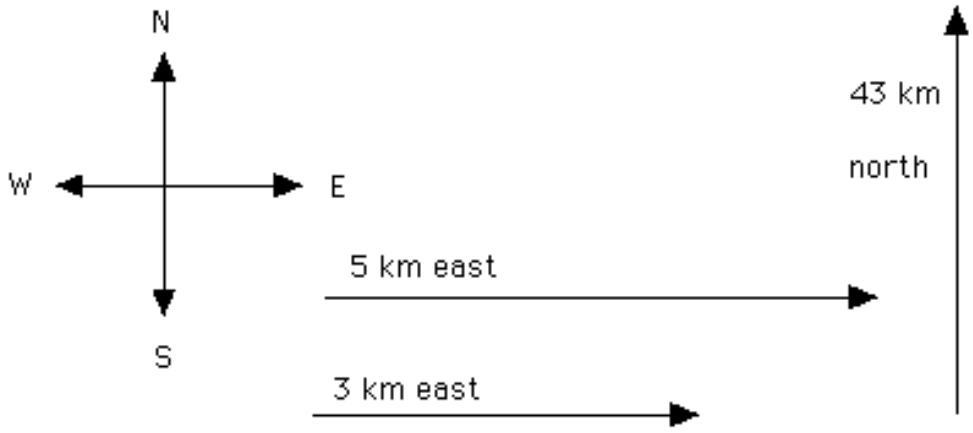
- Examples of scalar quantities include *time*, *mass*, *volume*, *area*, *distance*, *speed*, *work*, *energy*, *power.*
- Note (1): *distance* is the length of a path travelled; for example, running north for 300m, then turning around and running south for 200 m means you ran a total distance of 500 m.
- Note (2): *speed* is the rate of *distance* travelled, or distance travelled divided by a *time* interval. Speed is a scalar quantity because both distance and time are also scalar quantities.

Vectors - have both magnitude and direction

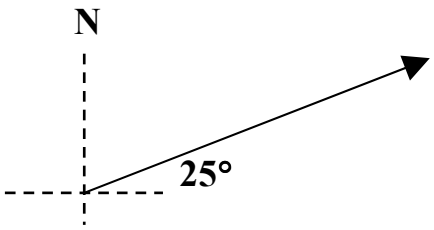
- Examples of vector quantities include *displacement*, *velocity*, *acceleration*, *force*, *momentum*, *impulse*, *field strength*.
- Note (3): *displacement* is the change in position of a moving object, or the difference between starting and finishing points. For example, running north for 300m, then turning around and running south for 200 m means your total displacement is 300 m (N) – 200 m (S) = 100 m due north from your starting point.
- Note 4: *velocity* is the rate of change in position, or net *displacement* divided by a *time* interval. Velocity is a vector quantity because displacement is a vector quantity.
- Note 5: *acceleration* is the rate of change in *velocity*, or change in velocity divided by *time*. This makes acceleration a vector quantity – e.g.; acceleration due to gravity is -9.8 m/s^2, or 9.8 m/s^2 down.

In this unit, we will be focusing on vector analysis. To show a vector, draw an arrow in the direction of the vector and scale the length to reflect the vector's magnitude.

Here are some examples of displacement vectors, using a scale of approximately 1 cm = 1 km:



To show a vector that is not N, S, E or W:



This vector direction can be described in two ways:
a) **25°** north of due east, or **25° N of E**
b) **65°** east of due north, or **65° E of N**